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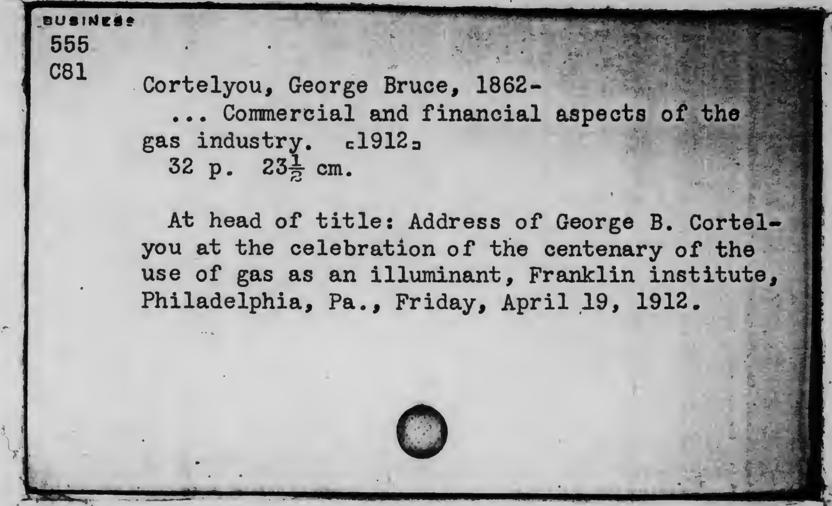

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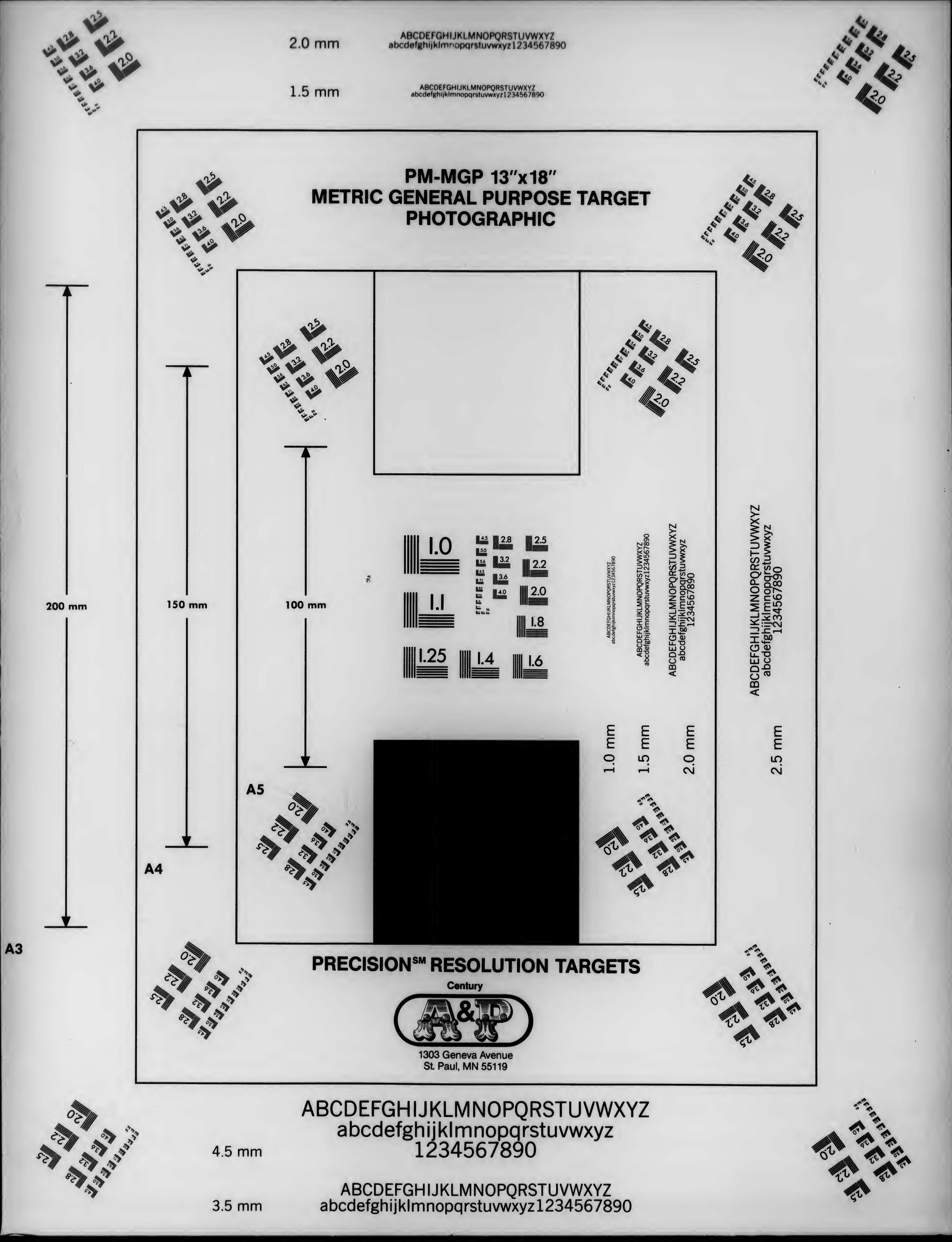

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ADDRESS OF GEORGE B. CORTELYOU AT THE CELEBRATION OF THE CENTENARY OF THE USE OF GAS AS AN ILLUMINANT, FRANKLIN INSTITUTE, PHILADELPHIA, PA., FRIDAY, APRIL 19, 1912.

COMMERCIAL AND FINANCIAL ASPECTS OF THE GAS INDUSTRY.

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MR. CHAIRMAN, LADIES AND GENTLEMEN :

At the outset of my remarks I feel that I should say a word in appreciation of the initiative and energy that have made possible this series of lectures ; and I welcome the opportunity to join with those who recognize the public spirit of the individuals and associations that have contributed to the success of the celebration.

Historical.

About one hundred years ago, two of the leading nations of Europe brought forth independently of each other an invention which was destined to become a factor mightier than almost any other for the promotion of human comfort, for advancing civilization, and for giving employment to great industrial armies.

On this occasion, therefore, we celebrate the birth of a great industry ; and it is fitting that we recall the names of those patient pioneers whose struggles are a matter of history, and whose subtle creation illumines the civilized world.

Among the names which we honor to-day are Van Helmont, Clayton, Murdock, Lebon, Clegg and Winsor, but it is generally conceded that to William Murdock belongs the credit of being the first to develop the gas industry along practical lighting lines.

From Murdock's own account we learn that in 1798 he removed from Cornwall, where he had conducted important experiments, lighting his own house (1792), to Boulton, Watt & Company's works for the manufacture of steam engines at the Soho Foundry, near Birmingham, where he constructed an apparatus on a large scale which was applied to the lighting of the principal building. His experiments were continued with some interruption until the year 1802, when a public display of the light was made in the illumination of the manufactory at Soho, on the occasion of the celebration of the Peace of Amiens. A contemporary writer states: "This remarkable illumination was the first public display (of gas-lighting) in this country and at the time produced a very strong impression upon the inhabitants of the town. The illumination of Soho works on this occasion was one of extraordinary splendour. The whole front of that extensive range of buildings was ornamented with a great variety of devices, that admirably displayed many of the varied forms of which gas light was susceptible."

Murdock's efforts were stimulated by news of the activities of Lebon, of Paris, along similar lines. This is related in a letter addressed to Soho from which Dr. Henry published the following extract: "I don't know exactly at what time the first trials were made or published in France. The first notice we received of them here was in a letter from a friend at Paris dated November 8, 1801, in which he desired me to inform Mr. Murdock that a person had lighted up his house and gardens with the gas obtained from wood and coal and had in contemplation to light up the city of Paris."

The testimony of James Watt, Jr. (son of the great inventor), who was associated with Matthew Boulton in the firm of Boulton & Watt, proprietors of the Soho Works, shows, to use his own words, that "at the period when the peace took place, which, I believe was in the spring of 1802, public display of these lights was made in the illumination of Mr. Boulton's manufactory, which then took place. In 1803 we erected an apparatus for the purpose of giving a light to a part of our own works and till 1804 we continued making experiments on the gas produced and also on the different coals out of which the gas was to be made; on the manner of making the retorts best adapted to the purpose; upon the materials and construction of the pipes; upon the size and construction of the gasometers; upon the economy of the different sorts of burners, &c. The experiments were very long and attended with a great deal of expense. We were out of pocket £4,000 or £5,000 and are so at this moment for the experiments and machinery."

In Hunt's "History of the Introduction of Gas Lighting," we are told that:

> "It was the fear of being anticipated by Lebon that quickened the firm's pace and finally overcame their reluctance to embark in this new venture. Without Lebon therefore, Murdoch's invention might have remained indefinitely in the background: but, it may with equal justice be said that without Murdoch, Lebon's ideal could not have been realized. There is no evidence that either Murdoch or Lebon aimed at anything beyond a number of separate and independent installations; but Lebon's idea of 'lighting a part of Paris with it' seems to have fired the imagination of his follower, Winsor, in whose hands a public supply of gas lighting became a reality, altho this was only made practicable by the achievements of Murdoch and the development of engineering and industrial art."

Lebon was granted a patent for a term of 15 years from September 28, 1799, as shown by the records in the Patent Office at Paris.

Frederick A. Winsor, contemporary of Murdock and Lebon, is described as a man of little experience but possessed of an extremely sanguine temperament and unbounded imagination, combined with determination and ingenuity. He was the first to advocate publicly the distribution of gas from a central source, and was the promoter of the first chartered gas light company. The London press spoke of him most disparagingly and described his scheme of gas lighting as "wild, absurd and extravagant in its conception and fraught with the greatest danger in its execution," and alluded to Winsor's proposal for "enlightening the inhabitants of London" as "fire of wind." Winsor was himself responsible for much of this opposition by reason of his extravagant statements as to profits (as much as one thousand per cent being promised) of the venture. Indeed a perusal of his flowery prospectus would give pause even to the modern advertising man, and the circus poster in its palmiest days hardly approached its flights. For instance, in one of his pamphlets, after claiming such utilities as "tanning skins," "smoking bacon and hams," and "fixing color in dyeing," he says, "as to illuminations, they may be carried on to the utmost extent of beauty and variegated fancy, by this docile flame, which will play in all forms, submit to instant changes, ascend in columns to the clouds, descend in showers from the trees, walls, &c., arise from the water, and even in the same pipe with a playing fountain. The constant varying of the flame in rooms and gardens between flaming pyramids, festoons, garlands, roses, flambeaux, &c., afford the spectator a most delightful sight, cherish the soul and create good humor by uniting convenience, utility and pleasure."

In 1803 and 1804 Winsor publicly exhibited his system of illumination by coal gas at the Lyceum Theatre, London. He showed the manner of conveying the gas to different parts of the house, and by the use of various kinds of burners he was enabled to display something of that variety of form which may be given to the flame. His exhibitions proved that the intensity of coal gas rendered it less liable to be extinguished by strong and sudden gusts of wind, and he also showed that if properly managed the burning of it would not produce smoke or throw out sparks such as often fly from the burning wicks of lamps or candles, a circumstance which rendered gas a desirable kind of light, as being less dangerous in its use than either of the other forms. Afterwards Winsor moved his exhibitions to Pall Mall where early in 1807 he lighted up a part of one side of a street, which was the first instance of this kind of light being applied to such a purpose, and to him therefore belongs the credit of initiating the system of public gas lighting.

As the projector of the National Light & Heat Company Winsor is stated to have raised nearly £50,000 by subscription for this purpose, all of which, however, was squandered upon commercially unproductive experiments.

In 1809 Winsor projected a new Light and Heat Company and applied to Parliament for an act to incorporate it. This is an important fact in the history of the gas industry, for it was the foundation of the London & Westminster Chartered Gas-Light & Coke Company. The capital proposed to be raised at this time was £200,000. The persons who applied for the act had many difficulties to combat arising both from interest and prejudice. Their projects were represented as visionary and the execution of them fraught with considerable danger. On this occasion they were opposed by Mr. Murdock on the ground of his priority of right to the discovery. The application terminated unsuccessfully, partly because of the unfavorable impressions produced by Winsor's extravagant claims. Murdock's opposition to Winsor resulted in Parliament protecting the appliance manufacturers against possible competition by the lighting company.

In 1810 another application was made to Parliament by the same parties and though it met with some opposition an act was passed authorizing His Majesty to grant them a charter within three years from the time of passing the act.

Thus Winsor's plan of a National Light and Coke Company was in part accomplished by the formation of a local gas-light and coke company. The incorporation of this company, which occurred in April, 1812, the centenary of which we celebrate, was an important step in the direction of placing the new industry upon a basis that promised its permanent establishment and increased the probability of its ultimate success. Experience had already proved that the resources of the individual were inadequate to cope successfully with undertakings of such magnitude and cost. From calculations as well as from actual surveys that were made it appeared that the expense of laying down pipes for the city of Westminster alone would be £150,000 without including any other expense.

In 1813 Westminster Bridge was lighted with gas. About this time the City of London Gas-Light Company was established, and two others were projected for the metropolis, one of them in Southwark and the other in the eastern district.

From the time of the formation of the Chartered Gas-Light and Coke Company to the year 1813, experiments had been carried on by Messrs. Winsor, Accum & Hargraves, at which time the company was almost on the point of dissolution.

Samuel Clegg was engaged as engineer of the Company, he having been educated as an engineer in Boulton & Watt's foundry, at which time his attention was first directed to the practicability of distilling gas from coal when assisting in the illumination of the Soho manufactory.

In 1815 Clegg invented and patented the gas meter and governor. The first meter consisted of two large bladders filled alternately with gas and contained in two cases weighted

to a certain pressure, the valves being sealed with quicksilver.

Though credit for the original invention and construction of the gas meter belongs to Clegg it has been very materially improved by Samuel Crossley and John Malam.

It is to the introduction of this simple instrument, now in universal use, that a great deal of the success of gas-lighting must be attributed.

Thus Clegg seems to have been the pioneer in many of the important inventions connected with gas-lighting. Besides the gas meter he introduced the cylindrical gas holder and an automatic pressure regulating device. It is he also who was chiefly responsible for the success of the original Chartered Gas-Light and Coke Company, and he was the first man to commercialize city gas lighting on a large scale.

In 1816 gas had become very common in the City of London.

Paris was first lighted by gas in 1820.

In 1833 the French National Gas Company was projected for lighting Boulogne-Sur-Mer. The capital of £10,000 being too small the Company was taken over by the European Gas Company and capitalized for £200,000 for the purpose of lighting other European towns.

Gas was used at Havre, Caen and Amiens in 1835,—at Nantes and Rouen in 1846. The plants for all of these gas works were sent from England.

Before the second London company was chartered our own City of Baltimore granted a charter to the first company to be regularly organized for the purpose of exploiting gas for the illumination of streets and cities in America.

Gas chronology tells us that Baltimore was not only the first city in this country to be lighted with gas, but that it was also the first city in which gas meters were manufactured in the United States, and gives the name of Samuel Hill as the meter maker.

A brief historical summary of gas development in the United States is given in the U. S. census reports for 1900, from which the following is adduced:

The history of the gas industry in this country dates from 1806 at which time David Melville, of Newport, R. I., lighted his premises by means of coal gas which he had manufactured thereon. This took place nine years after the experiments in England. The apparatus as used by Melville was necessarily crude, but underwent improvements from time to time until, in 1813, he secured a patent and later used gas for the lighting of a cotton mill in Watertown, Mass. Gas was also used at about this time in a mill near Providence, R. I., and was employed in 1817 as an illuminant in a light-house. The growth of the industry was at first slow, but with the advances in the details of the construction and operation of gas plants, the improvement and development of special tools and appliances, and the increasing knowledge gained by experience of the laws of physics involved, there came a much more rapid growth. As early as 1816 a company was chartered in Baltimore, Md., followed in 1821 by the formation of a Company in Boston, Mass. New York City adopted gas lighting in 1823 and several years later companies were formed in Brooklyn, N. Y., and Bristol, R. I. New Orleans adopted gas about 1835, twenty-nine years after Melville introduced the new illuminant in this country.

A proposition to light Philadelphia with gas was made in 1803, and a similar one was made in 1817, but both offers were rejected. Repeated efforts were made thereafter looking to the lighting of the city with gas, but it was not until March 21, 1835, that an ordinance was passed providing for the construction of the works. The plant was completed Feb. 8, 1836.

Objections Raised to the Introduction of Gas.

Like most inventions, gas lighting was not at first taken seriously. It seemed to the American and European world of 1800 to be on a par with the Laputan philosopher's scheme for making sunshine out of cucumbers. People were afraid of this "burning air," as it was called, and could not be convinced that fire or explosion would not be the inevitable result of its general use. When that daring New Yorker, Samuel Leggett, first lighted his house, No. 7 Cherry Street, with gas, people stood at a respectful distance and looked at it much as they might have looked at the witches dancing in Kirk Alloway.

In Europe the prejudice against gas lighting at the time of its introduction was equally strong. Napoleon ridiculed it and said "C'est une grande folie". In 1803, Sir Walter Scott wrote to a friend: "There is a madman proposing to light London with—what do you think? why, with smoke!" Yet Scott himself had Abbotsford piped for gas not many years later. Clegg gives an account of the horrors of the lamplighters when they first beheld the burning gas and how he was obliged to light the lamps himself for some time on account of the fears of the people. Even such men as Sir Humphry Davy and Sir Joseph Banks were unable for many years after this to overcome the prejudice which existed in their own minds concerning it and they thought the scheme a wild and dangerous one.

Another concrete instance of this prejudice can be cited right here in Philadelphia. On November 28, 1833, a petition signed by several hundred of the excellent people of this city was addressed to "The Honorable the Select and Common Councils of the City of Philadelphia," protesting against the use of gas, in the following terms:

> "GENTLEMEN: The subscribers beg leave respectfully to remonstrate against the plan now in agitation

for Lighting the City with Gas, as they consider it a most inexpedient, offensive, and dangerous mode of lighting. In saying this they are fully sustained by the accounts of Explosions, Loss of Life, and great destruction of property, where this mode of lighting has been adopted.

"We consider Gas to be an article as Ignitable as Gunpowder, and nearly as fatal in its effects; as regard the immense destruction of property, we believe the vast number of fires in New York, and other cities, may be in a great measure ascribed to this mode of lighting; the leakage of pipes and carelessness of stopping off the Gas, furnish almost daily instances of its destructive effects. And when we consider that this Powerful and Destructive Agent must necessarily be often left to the care of youth, domestics and careless people, we only wonder that the consequences have not been more Appalling. It is also an uncertain light, sometimes suddenly disappearing and leaving streets and houses in total darkness.

"The waters of the Delaware and Schuylkill, now considered the most pure and salubrious in the world, as many long voyages have fully tested, must soon, we fear, experience the deterioration which has reduced the Water of the Thames to the present impure and unhealthy state, for no reservoir will be able to contain the immense fetid drains from such an establishment, and very soon the rivers must be their receptacle, to the destruction of the immense Shoals of Shad, Herring, and other fish with which they abound; the same cause must produce like effects. Salmon, smelts and other fish, formerly caught in vast quantities in the Thames, have nearly all disappeared; the constant digging up of the streets, the circumstance of the gas pipes which at the intersection of each square must come in contact

with the water pipes, are difficulties and evils which we would anxiously avoid.

"In conclusion we earnestly solicit that the lighting of our city with oil may be continued.

"And your petitioners, etc., etc."

If the signers of this petition could appear upon the scene to-day and witness the splendid achievements of gas under the management of your great Philadelphia company, I am sure they would be in favor of the "recall", at least in so far as it applied to their petition.

But the opposition to the use of gas should not surprise us. It seems to be a fundamental trait of human nature to oppose, for a time, everything that is new. Coal had the same prejudice to overcome. In the year 1306 the use of coal in the place of dry wood and charcoal by brewers, dyers and other artificers employing great fires was prohibited by proclamation at London. It was held that the products of its combustion, smell and smoke were prejudicial to health and hurtful to vegetation. Its use was made a capital offense, and we are told that a man was actually executed for burning coal within the metropolis. What a boon such a law would be to the gas companies to-day!

It does not take long, however, for human nature to get used to novelty, but remarkable it certainly is, considering the difficulties of communication and the meager resources of a new country, that America was but little behind Europe in the use of gas.

The history of the pioneer gas companies of this country shows that in addition to, and to a considerable extent because of, the prejudice that existed against the new and supposedly dangerous illuminant, it was a very difficult matter to secure the necessary capital to erect and operate the plants, and it was some time before the industry was established on a commercially sound and profitable basis.

Gas as an illuminant has had several competitors which at the time of their appearance in the field threatened its existence. In the early days of the industry the gas manufactured had an illuminating value of about 15 to 17 candle power. Compared with the light of candles or of the crude whale oil then in use it was considered a wonderful illuminant. This superiority was soon threatened, however, by the introduction of kerosene and improved oil lamps, the general use of which interfered seriously with the rapid increase of the sale of gas.

These conditions would have greatly retarded the growth of the industry had not the problem been solved by Du Motay and Lowe, the former a Frenchman and the latter an American, who independently of each other were carrying on experiments which were to result in the introduction of the so-called water-gas. The investigations of both Du Motay and Lowe were conducted in this country, so that the development of the water gas industry is purely American. The first plant using the Lowe process was erected at Phœnixville, Pa., in 1873. At present, although the exact figures are not available, the census reports indicate that the amount of water gas sold for public use is in the neighborhood of 75% of the entire quantity of gas sold.

The advent of electricity for lighting purposes did not, as some might suppose, check the progress of gas. On the contrary, as has been the history where improved methods of lighting have developed, both kinds of lighting profited by the increased efficiency; and since the introduction of the incandescent mantle, notwithstanding that the resultant yield of illumination per cubic foot consumed was practically quadrupled, the reduction of gas output did not follow; but, on the contrary, vastly increased. The development of high-pressure incandescent lighting systems, such as are in vogue in the leading European cities, is another movement which bids fair to keep the gas industry to the fore.

Production and Prices.

The trend of prices for gas has been steadily downward from the beginning. In New York City, for instance, the price in 1826 was $10.00 per thousand cu. ft.; in 1846, $6.00; in 1866, $3.50; in 1886, $1.25; in 1897, $1.20; in 1898, $1.15; 1899, $1.10; in 1900, $1.05; in 1901, $1.00; in 1906, 80c., the present rate. These reductions have been made possible by various economies in production, and particularly by the more extended utilization of by-products and by promoting the use of gas for domestic and industrial purposes.

Neither gas nor electric light has been a factor in the increased cost of living of which we hear so much. The Massachusetts Commission on Cost of Living reported that the average price for gas in that State in 1890 was $1.46 per thousand cu. ft., and in 1909 91.4c., a decrease of 36.4% in the period. The Commission also reported an increase in the prices of twelve staple commodities from 1897 to 1910 of 51.7%. During the same period wages also underwent a marked increase. If the experience of Massachusetts may be taken as fairly representative of the country at large, it shows that in a period of steadily advancing prices, both for commodities and for labor, the public has had the advantage of a steadily diminishing price of gas for all purposes.

The output of gas has been continually on the increase, notwithstanding the competition from electricity. From the subjoined table it appears that in 1898 the companies reporting showed total sales of 18,431,200,000 cu. ft., for which $21,502,325 was received, an average price of about $1.17 per thousand. Ten years later, 1908, the companies reporting showed total sales of 156,909,310,000 cu. ft., for which $133,571,122 was received, an average price of 85c. per thousand.

GAS SALES.*

U. S. SALES IN CUBIC FEET—AMOUNT AND PRICE PER CUBIC FEET.

	M Cubic Feet.	Total M Cu. Ft.	Average price per M Cu. Ft.	Amount.	Total Amount.
433 Companies Reporting in 1898:					
Sold for Illuminating,	15,955,149		$1.188	$18,955,149	
Sold for Fuel	2,476,051	18,431,200	1.029	2,549,181	$21,502,325
552 Companies Reporting in 1908 (Oil and Water Gas):					
Sold for Illuminating.	76,804,546		.92	70,294,158	
Sold for Fuel............	26,542,951	103,347,497	.98	26,049,063	96,343,221
506 Companies Reporting in 1908 (Coal Gas):					
Sold for Illuminating.	32,485,571		.73	23,599,930	
Sold for Fuel............	21,076,242	53,561,813	.65	13,627,971	37,227,901
Total Coal and Water Gas Sold..............		156,909,310			$133,571,122

The growth in gas output as compared with the growth in population shows that the gas sales in large cities grow almost twice as fast as the population. For instance, in four great boroughs of New York City the 1890 census and 1910 census compared show an increase in population of 90.6% in the 20 years, while the increase in gas sales in the 17 years from 1893 to 1910 was 164.6%, or, relatively, per year about 5% for population and 9.67% for gas.

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* Compiled from report of Dept. of the Interior, U. S. Geological Survey—1902 and 1908—E. W. Parker.

COMPARATIVE STATISTICS—FOUR BOROUGHS OF NEW YORK CITY.

	Population:		
1890:	Manhattan	1,441,216	
	Bronx	88,908	
	Brooklyn	838,547	
	Queens	87,050	2,455,721
1910:	Manhattan	2,331,542	
	Bronx	430,980	
	Brooklyn	1,634,351	
	Queens	284,041	4,680,914
	Gain in 20 years—4 Boroughs		2,225,193 = 90.6%

	Gas Output:	M cu. ft.	M cu. ft.
1893:	Manhattan & Bronx	11,343,000	
	Brooklyn & Queens	3,439,000	14,792,000
1910:	Manhattan & Bronx	27,217,105	
	Brooklyn & Queens	11,900,000	39,117,105
	Gain in 17 years		24,335,105 = 164.6%

Population in four boroughs—4,680,914.
Sales in four boroughs—39,117,105,000 cu. ft.
8,350 cu. ft. per capita per annum.

Gas Securities.

Gas has unquestionably for many years been a staple commodity and its growing field of usefulness in industrial work as well as for cooking, heating and other domestic purposes, has given gas securities a standing and stability hardly approached by any other class of investment. As has been shown, its ratio in increased output far exceeds the ratio of growth of population; for instance, the United States Census shows an increase in the decade from 1900 to 1910 of about 21 per cent. In about one-third of this time, that is, from 1905 to 1908, the sales of gas increased from 117,866,000,000 cubic feet to 156,909,000,000 cubic feet, an increase of 39,043,000,000 cubic feet, or 33% in three years. This would indicate an approximate increase of 100% in the decade or five times the ratio of increase given for the population, from which we may conclude that gas securities are destined to maintain their high place as desirable investments.

It is claimed that no other class of bonds shows such a small percentage of defaults as gas securities. Quoting from a recent article in one of the financial journals we have the following:

> "Gas bonds have a first class record for safety; they are usually secured by a mortgage on all the property rights and franchises of the company issuing it.
>
> "The condition and value of the property are passed upon by competent gas and mechanical engineers before the bonds are issued.
>
> "The bonds are issued only with the approval of a trust company, which is the trustee, after the trust companies have decided that the bonds may be issued in accordance with the terms of the mortgage and trust deed. A gas company operates under the franchise or license of a city and usually only one company serves one community. It is a 'necessity' and the residents of the community use gas for cooking and lighting with practically the same certainty that they pay taxes or use the utilities furnished by the municipality itself. The business is operated on a broad foundation, relying on a small profit from many customers rather than a large profit from a few."

A study of the gross and net earnings of lighting companies shows that the effect of periods of commercial depression such as were experienced in 1907 and 1908 is slight as compared with the effect upon the earnings of general industrials. The variation between the two is very marked for such periods, the earnings of lighting companies showing a material gain, while those of general industrials show a decided falling off.

A tabulation covering three years for sixty-one prominent cities in the United States, all of which have well established sources of electrical supply, shows an increase in gas consumption from 1899 to 1902 of 31%. In its widening field for industrial purposes, two powerful factors work for its development, the first of which is the fact that it requires no space for storage on the users' premises. Secondly, it is smokeless and eliminates the troublesome factors encountered in almost all other fuels—the handling of the fuel itself, incidental refuse, ashes, and the like.

In view, therefore, of the position of the gas industry, its continued growth and the variety of purposes to which its services may be put, it is fair to predict that, properly operated and with constant provision for invention and improvement, the business will steadily increase.

Some Agencies for Promoting the Sale of Gas.

No discussion of the subject that has been assigned me in this series would be complete without a reference to the work of the Commercial Gas Association which forms a most important connecting link between the producer of gas and the user.

It is conceded that a material factor in reducing the cost of gas production is increasing the output.

It is of course of vital importance that the product of the plant shall be of the required quality and that its manufacture and distribution shall be at the minimum cost consistent with quality requirements. This is certainly worthy of the best thought and effort of the technical man, and this work is likely to make such a demand upon his time as to preclude the possibility of his devoting any considerable attention to the commercial problems connected with the industry.

Salesmanship has become a science, and interchange of ideas and the discussion of ways and means for selling the engineers' product, make the importance of Commercial Gas Associations loom very large in the gas world of to-day, as it is mainly through the development and extension of this arm of the industry that the problem of enlarging the field of usefulness of gas must be solved.

It is with us as with other industries, if we are to have the highest efficiency, it must be through specialization. I believe the money of the gas company is well spent when it develops specialists in the selling line, and this brings to mind the fact that a close observation should be kept over the office man to see that those who deal with the public are sufficiently well informed and have the capacity to supplement thoroughly the salesman's work and to deal with the public in a satisfactory manner.

The commercial gas men have inaugurated aggressive selling campaigns, have instituted schools of salesmanship and have brought together the manufacturer, seller and user of gas appliances at their conventions, an important feature of which is the exhibition and demonstration of the latest and best gas-using devices. I am informed that a Commercial Gas Association has been formed in London similar to that in this country.

I am also a firm believer in the value to lighting companies of newspaper publicity; that is, going direct to the public through the advertising columns of the daily papers, telling in a plain, straightforward way of our product and our service, explaining the things which to the trained gas-man may seem rather elementary but which to the average man are more or less of a mystery. I know of nothing that is more promotive of good relations between the gas company

and the public than a frank declaration of the principles and policies of the company, as a public service corporation, made without reservation and thoroughly lived up to. Following the establishment in this way of a broad foundation of confidence, the company may advertise special appliances or particular features of its service, of the more strictly "business-getting" sort, with the certainty that the returns will amply justify the expenditure.

But even to-day a man ushered into the lighting world faces a field filled with skeptics. In the minds of many there is an inherent feeling of bias against the lighting man, primarily perhaps by reason of the fact that the average individual has no conception of the commodity we sell, its manufacture, the immensity of the time, money, energy and skill required to build up a gas lighting business; and this feeling of distrust is augmented by the fact that the commodity is of so intangible a nature that the buyer of it has no visual knowledge of its coming into his possession as a commodity; to the average man, *selling gas* is a thing apart from *selling light.* The commercial proposition of selling our commodity is further handicapped in the operation of selling as compared with other products which may be shown by the seller. It lacks attractiveness in display, in fact has none in itself, cannot be basketed and bundled up and carried away by the user who has chosen his purchase for its attractive appearance, has seen it measured by the yard or bushel, or weighed by the pound and taken in the hand and carried to the house. The gas-man has also inherited a deep seated antipathy of the user of his product by reason of the uncommercial methods of many of his predecessors in the business. Dealing as we do with all classes, all nationalities, all grades of people, and with those who to a great extent commenced doing business with us with this inherited prejudice, we are at once put upon the defensive. In dealing with the commercial proposition we must make a large portion of our work the uprooting of this prejudice, and this does not demand so much of our engineers and gas makers as it does of our commercial department men, those who meet the public and who are large factors in our service. And this word *service* should show up large before the employee of any public utility corporation. The shortcomings of a supply as to pressure, candle power efficiency and other essentials, are apt to be the matter of a moment and when remedied in a gracious manner leave no rankling; but the shortcomings which are evident in poor service, brought about by inattention, neglect, or slipshod methods, are not so easily effaced from the consumer's mind; so I say that this word *service* should be writ large in the mind of every worker for a public utility corporation. Some of our forbears did not appreciate this end of the business as vital to the commercial success of our industry, but we are getting away from old-fashioned methods and we feel that we have made great strides in this direction in the last few years.

When one reflects upon the truism that "one man on the block makes public opinion" and that there is a large probability of there being at least one unreasonable individual living within the area of a city block, it is not strange, in view of the fact that the satisfied gas consumer does not go to the trouble of announcing his satisfaction from the housetop, that is, not to the extent of disturbing his neighbors or keeping them awake with his joyous ebullitions, that the gas man is on the defensive a very considerable part of the business day. And this is in part because the gas man has allowed an air of mystery to surround his business. He has not given enough time and attention to educational work amongst his patrons—has not tried to explain the workings of that mysterious black tin box in the cellar, of which the average consumer stands in dread and to whose ear the little clicking noise of its mechanism is so ominous. Happily we are to-day on the road to enlightening our customers by giving to our employees a knowledge of these common things of the business, of which up to a comparatively recent time they were wofully ignorant.

Importance of Light to the Growth of Cities.

As a factor in the growth of cities it is generally conceded that the lighting company is a positive force for the general good. The importance of its work of providing the public with more and better light is appreciated by all who are connected with the development of municipalities and particularly of suburban districts. The value of light to a municipality from the purely commercial point of view is becoming more and more recognized, as is evidenced by the agitation among merchants the country over for additional street and store illumination. These tradesmen know well the value of illumination, both in the matter of window display and in the general publicity it attracts to the lighted district and to the city as a whole.

Light is the world's best policeman, for crime instinctively seeks the shadows and the dark corners. I believe that many of our American cities could find no better way of co-operating with the efficient police bodies they have than by thoroughly illuminating the communities to the very limit of municipal control.

In King's Treatise we are given this interesting information concerning the early days of gas lighting:

> "The police officers from Worship Street and other places gave evidence of the great utility of gas lighting in preventing robberies, and they also mentioned an instance where perpetration of this crime had been apprehended by its aid. Also that three-fifths of the street oil lamps were extinguished before midnight, and that the thieves would borrow ladders from lamp lighters for the purpose of committing robberies."

This was brought out in connection with an application made in London, in 1816, by the Chartered Gas-light & Coke Company for an increase in capital.

The Modern Gas Company in its Relation to the Public and the Municipality.

As a necessity; as a convenience; as a promoter of trade; and as a source of good or ill-will as between the company and the community—the last named largely in proportion to the degree with which the company's affairs are conducted with business sagacity and common sense. It is a public service corporation. Its rights and the rights of the consumer must be safeguarded if both are to realize beneficial results. It is not a one-sided proposition; one falls unless the other is supported. They are inter-related; they should be friends, not enemies. It is a mischievous interpretation of their relations that groups all the wrongs on one side and all the rights on the other.

To repeat before such a representative body as this all the arguments for the company and for the consumer is not my purpose, nor is it necessary at such a time. It is sufficient to say that the relation of the company to the municipality should be characterized by integrity and efficiency of management and fair and impartial treatment of all who do business with it. In turn, when the public is fairly and efficiently served, that is, with the best service at the lowest rates compatible with a just estimate of their respective relations, the municipality should support and encourage the company. As I have said upon another occasion, the public is less concerned with the precise rate it pays than it is with having thoroughly efficient service. If the company is honestly conducted and its affairs are given that degree of publicity which is proper and is the public's due, it does not begrudge to the company adequate returns, nor will it yield to the screamings of the demagogue and the self-seeker when he misrepresents

the facts or encourages unjust attacks. On their side the companies must keep out of politics, and the mystery of management must become less of an obsession with those who have important undertakings of this character entrusted to their hands.

Of course all this presupposes a full recognition of the rights of employees. No company will have permanent success, or deserve to have it, unless those whose labor has so vitally to do with the enterprise are regarded as an integral part of it. Adequate wages, reasonable hours, generous treatment all along the line, with a system of management that encourages to the highest possible degree the spirit of the individual worker, are all their due and are recognized by the enlightened corporation.

If there is one thing more than another that is a menace to industrial progress, I believe it is the untenable position assumed bv some extremists who would limit the return allowed to such corporations as those which are of the public utility class to a rate so low that it either barely equals the legal rate of interest, or, taking into account the varying factors that must be considered in the case of each company, a rate that is practically but a fraction above confiscation. To induce original investment and development, to insure progress after establishment, to safeguard both the company and the community, a return not merely theoretically but actually fair and liberal must be permitted if the normal laws of trade are still in effect, and we believe that they are.

It should be remembered that when franchises were granted to public utility companies they were granted with the idea that a service absolutely essential to the growth of the community was to be provided, and it must also be remembered that in many cases those who obtained these privileges or franchises faced a serious risk in making their investment, that there was no assurance that an adequate return would be forthcoming for the money and energy expended in the building up of the service.

A factor which the unthinking man should have brought to his notice when the supposed enormous profits accruing to lighting companies are discussed, is the ratio between investment and gross income. Investigations show that the annual gas sales of many of the companies do not exceed $15 for each $100 of investment. It must not be inferred from this that these companies make $15 per year on every $100 investment, but that their actual sales each year amount to but about one-seventh of the money invested. This would indicate an investment of $7.00 for each 1000 feet of annual sales at $1.00 per M approximately. In other lines of business it is expected to turn over the capital once, twice or three times a year, but here is a business in which millions are invested in which the capital is turned over only once in about seven years.

It has come to be well-nigh axiomatic in the gas industry that each company must be considered on its merits, that hardship and injustice result when one company is expected to meet all the requirements of the business under the same restrictions as every other. Engineering difficulties, extent of territory, character of population, maximum demand and a number of other considerations must in each instance be given their fair and proportionate bearing upon the entire problem.

But we cannot expect all of the desirable factors to which I have alluded to be fully developed at once; substantial and permanent progress in any industry, in any line of human endeavor, is usually of slow growth. But we can work toward them with the certainty that the material returns will be gratifying, and that we shall be contributing, if only in a slight degree, to the establishment of efficiency and equity and justice in our commercial transactions.

FRANCHISES.

An official of one of the largest and most active of our American companies dealing in and having to do with the management of public utilities, Mr. Arthur S. Huey, quite recently gave utterance to some suggestions on the subject of franchises that will bear frequent repetition, and I am presuming upon his courtesy in embodying them in this paper. They were contributed to a well-known publication a few months ago and admirably voice the sentiments of progressive managers. Said he:

> "The principal obligations of both parties to a franchise should be—
>
> *On the part of the Utility Company:*
>
> 1st. Rendering of good, adequate, and continuous service.
>
> 2nd. Fair and reasonable rate schedules.
>
> 3rd. No discrimination among consumers of the same class, or between classes of customers for like service.
>
> 4th. Extension of service into all populated sections of the municipality and suburbs.
>
> 5th. Earnest endeavor to market the greatest possible volume of service.
>
> 6th. Adoption of approved inventions and developments in machinery and apparatus.
>
> 7th. Sound financial management.
>
> 8th. A high standard of physical maintenance.
>
> 9th. Public spirited attitude in all matters concerning the general welfare and advancement of the community.
>
> 10th. Broad and liberal business administration.
>
> 11th. Keeping faith with the people in all agreements, promises and announcements.

12th. Strict obedience to law and no participation in politics.

On the part of the public :

1st. The same decree of confidence, encouragement and respect that one business man accords to another, that any citizen expects from his neighbor.

2nd. Willingness to permit a fair profit on the capital, energy, ability and risks embodied in the undertaking, to permit a profit greater than mere interest which could be obtained without effort or hazard.

3rd. Disregard of attacks by popularity seeking agitators.

4th. Willingness to recognize and reward improvements in service.

5th. Recognition of the fact that the operation of utilities differs fundamentally from merchandizing or manufacturing.

6th. Reasonableness in demanding large capital outlay for improvements not strictly necessary to the rendering of adequate service, such as placing wires underground in cities of small or medium size.

7th. To make prompt payment of bills, because the company cannot render the service demanded if its only source of income is retarded.

8th. Protection against direct competition. All authorities agree that public utilities can be conducted with greatest benefit to the public as controlled monopolies.

9th. Careful consideration of legislation, municipal, state and national, which would hamper and curtail the development of utilities.

10th. Recognition of the fact, that, starting from a given base line, which varies in different localities, reductions in rates can be secured without financial loss only by increasing the volume of service sold.

11th. Recognition of the fact that no utility company can well serve a municipality if it is not in prosperous condition, and able to secure the investment of new capital on favorable terms.

12th. Treatment of all questions affecting public utilities in a fair minded way, looking upon them as business questions without regard to political considerations."

MUNICIPAL AND PRIVATE OWNERSHIP.

Public utilities in the United States, in their establishment, development, and successful operation, have resulted almost wholly from private initiative and private capital.

There are probably not more than twenty-five municipally owned and operated gas plants in this country.

Under a system of municipally controlled utilities it may be expected that—

> " Operating costs will be, as they have been, materially increased by the demand for preferment and for employment of men whose services are not actually needed. The salaries being fixed by a council dependent upon public suffrage, makes it possible that there be no limit to the number of positions to be created and no control over the remuneration established for them.
>
> " The rule of municipally owned plants is to cut rates to a point below cost of production and make no allowance for depreciation and often no interest is charged off against the investment.
>
> " Expensive extensions are made to favored firms and when the time comes for renewals and repairs, the taxpayer will be asked to appropriate funds from the treasury or stand sponsor for a bond issue.
>
> " Economy of operation and advantageous selling

are the great factors that must determine the success of any lighting enterprise."

The operations of municipally controlled lighting plants are largely confined to street and municipal building lighting and do not as a rule furnish the citizens as individuals. Consequently they cannot be compared with the operations of a company supplying individual dwellers in a municipality; but where we have an opportunity of making comparisons of somewhat similar lines of operation the results are certainly not unfavorable to the private companies.

The report of a Committee of the National Civic Federation that investigated this subject calls attention to—

> " the danger here in the United States of turning over these public utilities to the present government of some of our cities. Some, we know, are well governed, and the situation on the whole seems to be improving, but they are not up to the government of British cities. We found in England and Scotland a high type of municipal government, which is the result of many years of struggle and improvement. Business men seem to take a pride in serving as city councillors or aldermen, and the government of such cities as Glasgow, Manchester, Birmingham and others includes many of the best citizens of the city. These conditions are distinctly favorable to municipal operation. * * *
>
> " However, there seems to be an idea with many people that the mere taking by the city of all its public utilities for municipal operation will at once result in ideal municipal government through the very necessity of putting honest and competent citizens in charge. While an increase in the number and importance of municipal functions may have a tendency to induce men of a higher type to become public officials, we do not believe that this, of itself, will accomplish municipal reform. We are unable to recommend municipal ownership as a political panacea."

COMPETITION VS. MONOPOLISTIC CONTROL OF PUBLIC UTILITIES.

Quoting from the Wisconsin Railroad Commission:

> " Duplication of such plants is a waste of capital, whenever the services can be adequately furnished by one plant only. It necessarily means that interest and maintenance must be earned on a much greater, if not twice as great, an investment, and that the actual cost of operation is likely to be relatively higher. Competition in this service therefore usually means a bitter struggle and low rates, until one of the contestants is forced out of the field, when rates are raised to the old level if not above it, or to a combination or understanding of some sort between them which also ultimately results in higher rates. In this way it often happens that the means which were thought to be the preventive of onerous conditions become the very agents through which such conditions are imposed. In fact, active and continuous competition between public utility corporations furnishing the same service to the same locality seems to be out of the question. This has been shown by experience. Such competition is also contrary to the very nature of things. Two distinct and separate corporations are not likely to remain separate very long after it becomes clear that the services rendered by both can be more cheaply and more effectively furnished by only one of them."

The Public Service Law of New York was enacted with the expressed intent that no more capital be invested than is required efficiently to supply the desired service, and it therefore not only restrains the issuance of stocks and bonds, but for the same reason also restrains the operations of new companies "unless necessary or convenient for the public service." In order to produce the most favorable economic conditions in the operation of utilities it is intended to prevent the economic waste which is inseparable from needless duplication of capital, and in justice to existing corporations it is clearly the duty of the Public Service Commission to protect them from destructive competition which would or might jeopardize the interests which have promoted the existing service by depriving them of a just return upon their invested capital, and prevent them from giving efficient service by so impairing their earnings as to make efficiency impracticable.

REGULATION BY COMMISSION.

If the question of rates is to be determined, in any degree, by a public body, it is a safe proposition to advance that a Public Service Commission, if rightly constituted, would be far better able to pass upon such an important matter than a legislature. With facilities which would be available by a Commission a more intelligent understanding could be had of conditions which should govern in such matters. The process of finding out by qualified experts through long and exhaustive research is not what would be at the command of a legislative body dealing with a voluminous public business in short sessions. Such a Commission which has gained the confidence of the public and the lighting company is better able through the investigation of its experts to cope with this intricate subject than a body which, as a body, has no particular local interest in such a matter as gas rates.

In the larger communities, competitive control of the gas industry has given place largely to monopolistic control, and this tendency received a great impetus in the establishment of State commissions to regulate and supervise various features of the business. In certain lines of business, regulated monopoly appears to be here to stay, and this is especially true of this industry. It is well that this is so, for the industry is certainly one of a class where competitive conditions work not only loss, hardship, and discomfort to the public, but in the weaker companies tend to inefficiency and generally poor service.

But regulation must not mean management, and it will not be construed as in any sense to mean management if commissions are constituted of competent and broadminded officials. On the other hand, there cannot with justice to the public or to the corporations be left a twilight zone in which neither appears to have jurisdiction. The light of common sense must be made to shed its rays upon this whole question, and when that day has fully dawned we shall find the exactions upon the corporations less burdensome and the resistance of the corporations to wise and reasonable requirements eliminated.

This centenary celebration is a milestone in the progress of one of the world's great industries. These hundred years have given to mankind many of the most marvelous of its processes and of its inventions. In a gathering of this character we draw upon the past for its history and its lessons. Knowing by these means of the character of the pioneers in the gas industry, and of many of their successors by more intimate association, I believe these men of the present are in a position to contribute much to the solution of problems that today confront the business community; and, furthermore, I believe they are alive to this opportunity for beneficent public service.

In this time of industrial unrest the business interests of the country should play a conspicuous and helpful part. Commercial honor is not a rarity; the ethics of trade are not mere memories of a glorious past in the life of the nation. Such generalizations are but the familiar stock-in-trade of the professional agitator or self-seeking politician. But business—big business and small business in all its manifold branches—owes its strength and its progress and its permanency to that ordered liberty whose fostering care it can in no wise so well assure, and when assured, repay, as by willing and complete obedience not only to the law of the land but to those higher laws without an observance of which we shall fall far short of our ideals of the true commercial greatness of a mighty people.

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